Tamarisk *Tamarix spp.*

Ecology: Tamarisk is an aggressive invasive species that has caused major ecological disturbance in the southwestern United States. This species has displaced or replaced native plant communities, degraded wildlife habitat, and is cited as a major cause in the decline of many native species, including threatened or endangered species (DeLoach et al. 2000).

Tamarisk is a woody shrub or small tree with alternate, scale-like leaves and smooth reddish-brown bark that becomes furrowed and ridged with age. Flowering occurs in spring and summer and is characterized by the development of clusters of pink flowers, 2 to 5 cm in length. This species reproduces both sexually and vegetatively. The fruit is a long narrow capsule that splits releasing thousands of tiny, hairy seeds in mid summer (MacMahon 1985).

Tamarisk prefers wet, open habitat near streams, reservoirs and irrigation ditches, and it has a wide tolerance of saline and alkaline soils (MacMahon 1985). Tamarisk is particularly successful where natural flooding is attenuated by water regulation such as sections of river downstream of dams (Shafroth et al. 2002; Sher et al. 2002). Tamarisk is able to tolerate drier periods without access to the water table (Smith et al. 1998). It transpires large amounts of groundwater, desiccates soils, and reduces the water table, further giving this species a competitive advantage over native vegetation (Sala et al. 1996; Cleverly et al. 1997; Dahm et al. 2002; Shafroth et al. 2002).

Tamarisk alters channel morphology, competitive hierarchies, and disturbance regimes in riparian ecosystems (Busch and Smith 1995). To its credit, tamarisk's roots stabilize banks and result in enlarged gravel bars and narrowed channels (Cooper et al. 2003). The dense stands formed by this species, coupled with a thick deposition of leaf litter, can be highly flammable, which encourages the spread of wildfires (Busch and Smith 1995). Tamarisk populations increase following a fire, due to their ability to re-sprout more successfully than native plants following a fire event (Hunter et al. 1988; Busch and Smith 1995; Ellis 2001). Altered disturbance regimes and hydrology, has allowed tamarisk to replace many native tree species including cottonwood *Populus deltoides* and willows *Salix spp.* (Cooper et al. 2009). This change in plant communities has altered native food webs and further changed the ecology of the ecosystem (Kennedy and Hobbie 2004).

Distribution: Originally native to Asia and southeastern Europe, tamarisk was introduced in the early 1800's to North America (Sobhian et al. 1998). It has since been extensively naturalized in the southwestern United States (MacMahon 1985) and it is now found in 42 of the 48 continental states (USDA, NRCS 2008). In Utah, tamarisk has spread extensively along the Green, Colorado and Yampa rivers and their tributaries. This species is now found in nearly every county in Utah (USDA, NRCS 2008).

Pathways of Introduction: Tamarisk was intentionally introduced as an ornamental, to serve as windbreaks and for stabilizing banks for erosion control (Sobhian et al. 1998). It

has since increased its range by spread through its abundant wind-borne seeds and vegetatively with the breakage and downstream dispersal of cuttings.

Management Considerations: A variety of methods have been used to control or eradicate tamarisk, including mechanical, chemical and biological treatments. Because this species is very difficult to eradicate once established, early intervention is important. Mechanical treatments include hand pulling young plants and bulldozing followed by root-plowing (Carpenter 2003).

Tamarisk can be controlled chemically using foliar sprays, cut-stump, or injection and frill treatments (USACE 2004). Chemical treatment through the application of herbicides, such as imazpyr and glyphosphate, has been used in dense monocultures of tamarisk with success (Carpenter 2003). Another technique for large stands is the use of burning followed by herbicide application to the re-sprouts. A widely used control technique for smaller applications or in mixed stands, where selectivity is desired, is called the cut stump method. This involves cutting the mature trees and applying triclopyr (Garlon4® or Remedy®) mixed with oil to the stumps or basal bark applications on plants (Carpenter 2003).

Biological control techniques using cattle and goats are unsuccessful if used alone. However, when goats are used as a post burning method to control re-growth they have been successful (Carpenter 2003). A biocontrol agent, the saltcedar leaf beetle *Diorhabda elongata* has been released in nine western states including Utah. Control by the leaf beetle is gradual and is expected to take up to three years. The mealybug *Trabutina mannipara* and the weevil *Coniatus tamarisci* have also been approved but not yet released, while awaiting results from beetle introductions (DeLoach et al. 2004)

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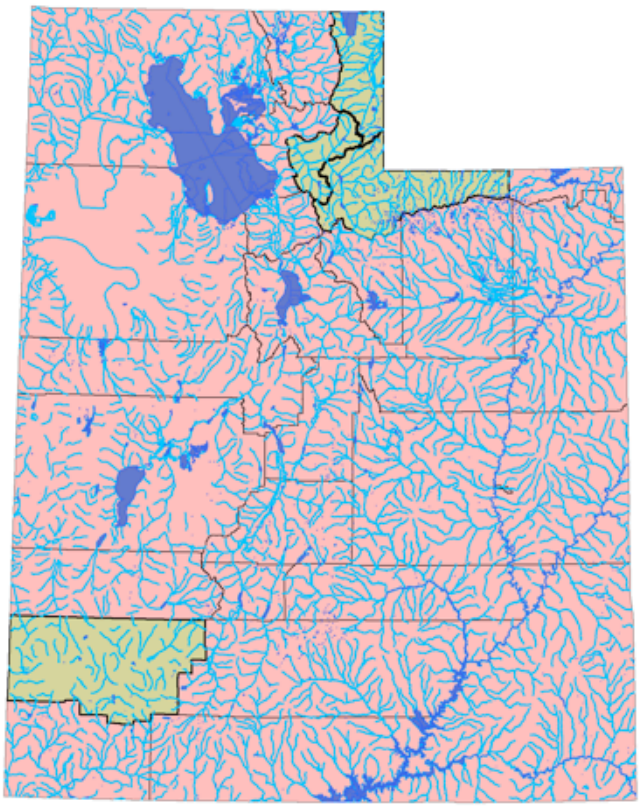
Tamarisk

Major Waterways
Counties Tamarisk is present in.



Forest & Kim Starr,
U.S. Geological Survey,
Bugwood.org

Steve Dewey,
Utah State University,
Bugwood.org